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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,513	10/26/2005	David B Smathers	020324 223P2	9964
33805 7590 05/07/2009 WEGMAN, HESSLER & VANDERBURG 6055 ROCKSIDE WOODS BOULEVARD SUITE 200 CLEVELAND, OH 44131				
EXAMINER YANG, JIE				
ART UNIT 1793		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/527,513

**Applicant(s)**

SMATHERS ET AL.

**Examiner**

JIE YANG

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 15, 16 and 18-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15, 16 and 18-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This is to acknowledge the receipt of the "Declaration under 37 CFR §1.131" and the "Applicant arguments/remarks" filed on 01/29/2009. Claims 1-14 and 17 have been cancelled, claim 21 is added as new claim, claims 15, 16, and 18-21 are pending in application.

#### ***Status of the Precious Rejection***

Previous rejection of claims 14-20 35 U.S.C. 103(a) as obvious over Yoshimura (US 6,911,162, thereafter US'162) in view of Miyanaga et al (US 6,544,917, thereafter US'917) has been withdrawn in view of Applicant's Declaration under 37 CFR §1.131 filed on 01/29/2009.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 15 recites the limitation "step (e)" in claim 21, and claim 18 recites the limitation "step (d)" in claim 21. There is insufficient antecedent basis for this limitation in the claim because the newly added claim 21 includes only steps (a) to (c).

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15, 16, 18-21 are rejected under 35 U.S.C. 103(a) as obvious over Yamakawa et al (JP 11139877 A, thereafter JP'877) in view of Komatsu (US 6,242,374 B1, thereafter US'374).

Regarding the newly added independent claim 21, which is amended from the original claim 14, JP'877 teaches a method of mixing  $\text{Si}_3\text{N}_4$  powder and metal Ti powder and sintering to obtain sintered compact (Abstract of JP'877), which reads on the limitations of providing metal powders; providing  $\text{Si}_3\text{N}_4$  powder; blending and sintering the powders as recited in the steps a), b), and c) of the instant claim. JP'877 teaches sintering at temperature from 1300 to 1400°C under 1 atmosphere pressure (Table 1 and Col.4, paragraph [0015] of JP'877) and JP'877 teaches that the densified and sintered compact has a density  $\geq 93\%$  (abstract of JP'877), more specifically the density is from 94 to 97% (Table 2 of JP'877), which reads the pressure consolidation said blend under heated conditions as recited in the instant claim and the density of JP'877's material overlaps the density range of greater than 95% as recited in the step c) of the instant claim.

Still regarding claim 21, JP'877 teaches adding sintering aid, for example  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$  into the sintering powder (Col.4, paragraph [0015] of JP'877), but JP'877 does not specify the sintering aid is MgO. However, MgO is functionally equivalent to  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$  in term of sintering  $\text{Si}_3\text{N}_4$ . This point is evidenced by US'374. US'374 teaches producing silicon nitride sintered body by sintering silicon nitride powder, sintering assistant agent and additives (including metals and metal oxides) (Col.2, lines 49-62 of US'374). US'374 teaches that the MgO is used as an addition component to promote a function as rare earth element and to enable the sintered body to be densified at a low temperature range (Col.7, line 66 to Col.8, line 14 of US'374). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute  $\text{Y}_2\text{O}_3$  and  $\text{Al}_2\text{O}_3$  with MgO as a sintering aid in the process of JP'877, because MgO would be a functional equivalent to  $\text{Y}_2\text{O}_3$  and  $\text{Al}_2\text{O}_3$  as the sintering aids, as evidenced by US'374 and success could be expected. See MPEP 2144.06.

Still regarding claim 21, JP'877 does not specify the metal element is W, however, W is a functional equivalent to Ti in term of sintering  $\text{Si}_3\text{N}_4$ . This point is evidenced by US'374. US'374 teaches the Ti and W are changeable in term of adding as additives in the mixture for making sintering  $\text{Si}_3\text{N}_4$  body

(Abstract, Col.2, lines 49-62, Col.8, lines 55-63, and claim 5 of US'374). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Ti with W as an additive in the process of JP'877, because W would be a functional equivalent to Ti as evidenced by US'374 and success could be expected. See MPEP 2144.06.

Regarding claim 15, it is a well known technique to machine the sintering product to a final desired shape. This point is evidenced by US'374. US'374 teaches: "...in the conventional sintered body, it is necessary to post-work the sintered surface of the sintered body thereby to expose a worked surface having a desired strength, followed by producing a final product using the sintered body." (Col.2, lines 13-30 of US'374). Therefore, it would have been obvious to one skilled in the art to apply a mechanical process after sintering in the process of JP'877 in order to obtain the desired surface conditions (Col.2, lines 13-30 of US'374).

Regarding claim 16, JP'877 teaches adding Ti from 5 to 70wt% in the mixture of metal and  $\text{Si}_3\text{N}_4$  (Table 1 of JP'877), which overlaps the metal range from 40 to 80 at% as recited in the instant claim. JP'877 teaches adding about 1 wt% sintering aid in the mixture. Regarding MgO, US'374 teaches adding MgO from 0.3 to 3wt%, which overlapping the amount of MgO: 0.05-6wt%

based on the weight of said  $\text{Si}_3\text{N}_4$  as recited in the instant claim.

Regarding claims 18-20, JP'877 teaches sintering at a temperature from 1300°C to 1400°C under 1 atmosphere nitrogen-gas-atmosphere (Table 1 and Col.4, paragraph [0015] of JP'877), which reads on the limitations as recited in claims 18-20.

### ***Response to Arguments***

The "Rule 131 Affidavits" filed on 1/29/2009 under 37 CFR 1.131 is sufficient to overcome the US patent 6,911,162 B2 (Yoshimura) reference.

Applicant's arguments filed 1/29/2009 have been fully considered but they are not persuasive. Regarding the arguments related to the amended features in the instant claims, the Examiner's position is stated as above.

Applicant's arguments with respect to the rejection of claims 15, 16, and 18-21 over Yamakawa et al (JP 11139877 A, thereafter JP'877) in view of Komatsu (US 6,242,374 B1, thereafter US'374) have been summarized as follows:

A) JP'877 patent does not teach or suggest a method of making a sputter target that is useful to sputter a heater layer for an inkjet printer as herein claimed. This reference does not disclose the blending of W metal powder with silicon nitride, and it does not teach use of MgO as set forth in all of the claims.

B) Komatsu (US'374) is also deficient in that it too is not directed to production of a sputtering target that is to be used for sputtering a heater layer. This reference does

not teach blending of W metal powder as herein recited as the US'374 disclosure since the reference is directed to the inclusion of "...oxides, carbides, nitrides, silicides, and borides of Ti, Zr, V, Nb, Ta, Cr, Mo, and W." (See Col.2, lines 49-62). The MgO in the US'374 is also devoid of any teach or suggestion of the formation of an agglomerated blend as set forth in the claim 20.

In response:

The applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the instant case, JP'877 in view of US'374 teaches the limitations of instant claims 15, 16, 18-21. The motivations for combining these references can refer to office action above. The Examiner notes that sputtering target being useful to sputter a heater layer for an inkjet printer as argued in the remark filed on 1/29/2009 is an intended use for the sintered  $\text{Si}_3\text{N}_4$ /metal compact taught by JP'877 in view of US'374. JP'877 teaches a similar method for sintering the mixture of metal powder with  $\text{Si}_3\text{N}_4$  powder under the similar conditions to obtain similar density compact as recited in the instant invention. Although JP'877 does not specify using W powder and MgO as sinter aid, however, W is a functional equivalent to Ti in term of sintering  $\text{Si}_3\text{N}_4$  and MgO is functionally equivalent to  $\text{Al}_2\text{O}_3$  and  $\text{Y}_2\text{O}_3$  in term of sintering  $\text{Si}_3\text{N}_4$  as evidenced by US'374.

The Examiner notes the Applicants argue that it is difficult to blend the W metal powder and  $\text{Si}_3\text{N}_4$  powder due to the large density difference between these materials.



However, Applicants have not provided evidence to support the argument that W (instant invention) and Ti (JP'877 patent) are not functional equivalents in term of sintering to obtain the desired sputtering target.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-270-1884. The examiner can normally be reached on M-F, 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

/Roy King/  
Supervisory Patent Examiner, Art Unit 1793